

Alaska Department of Fish and Game
Division of Wildlife Conservation
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Evaluation and Testing of Techniques for Ungulate Management

John Crouse

Research Performance Report
1 July 2002–30 June 2003
Federal Aid in Wildlife Restoration
Grant W-33-1, Study 1.56

This is a progress report on continuing research. Information may be refined at a later date.

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**FEDERAL AID
ANNUAL RESEARCH PERFORMANCE REPORT**

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 25526
Juneau, AK 99802-5526

(Revised 23 December 2003)

PROJECT TITLE: Evaluation and testing of techniques for ungulate management

PRINCIPAL INVESTIGATOR: John Crouse

COOPERATORS: Kenai National Wildlife Refuge

FEDERAL AID GRANT PROGRAM: Wildlife Restoration

GRANT AND SEGMENT NR.: W-33-1

PROJECT NR.: 1.56

WORK LOCATION: Kenai Moose Research Center, Soldotna

STATE: Alaska

PERIOD: 1 July 2002 – 30 June 2003

I. PROGRESS ON PROJECT OBJECTIVES

THE PRIMARY OBJECTIVE OF THIS WORK WAS TO TEST AND EVALUATE TECHNIQUES THAT ARE POTENTIALLY USEFUL FOR APPLICATIONS TO UNGLUATE RESEARCH AND MANAGEMENT.

To accomplish that goal, maintenance and operations activities were conducted at the Moose Research Center. Those tasks included daily animal care as well as upkeep, and repair of roads, buildings, fences, machinery, and research equipment.

We continued to collect data on the relationship between ultrasound estimates of subcutaneous fat and body composition in moose (n=61) and caribou (n=22). And, through collaboration with Dr. Duane Keisler, we have identified a potential assay for leptin in moose that we can relate to estimates of body composition obtained through ultrasound measurements.

Further work accomplished by MRC staff will ultimately generate a more thorough understanding of moose digestion, reproduction, and physiology. Several specific tasks were accomplished to build this understanding. A yearling cow moose at the MRC was fistulated in order to conduct digestion trials and validate chemical nutritional analyses. This was an initial step toward determining the chemical digestibility of forage plants. MRC staff also collected fecal samples from moose captured in collaborative work on the Yakutat Foreland for diet analysis and sampled moose forages from several different moose habitats across the state for nutritional analyses as first steps in developing a standard

nutritional database for moose forage plants from several different ranges across the state of Alaska.

This project has undergone changes that resulted from changes in staff and activities at the Kenai Moose Research Center. The chief change was the temporary suspension of the caribou nutritional ecology and reproduction studies, and the emphasis on daily operations, repair and maintenance as a result of budget, staff, and time constraints. However, collaborative studies were continued, and MRC staff assisted on research and moose capture operations with several partners, including Matt Moran with the United States Department of Agriculture/United States Forest Service Yakutat Ranger District. New collaborative work was also initiated with Region II research biologists Grant Hilderbrand and William Collins, and with University of Alaska Department of Biology Chair Don Spalinger.

II. WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

JOB 1: Maintenance and operations

Maintenance and operations activities of the Moose Research Center were conducted to facilitate research activities. Deteriorating wooden fence posts have been detached from sections of fence (~ 1 mile) where new steel drill-stem had previously been installed. We continued to repair and/or replace damaged and fallen sections of fence and install replacement steel pipe posts. We purchased 3300ft of fixed knot wildlife fence and used part of it to begin replacing the fence enclosing the caribou handling pens. The existing fence was not repairable and did not meet guidelines set forth by the Animal Care and Use Committee. We removed the deteriorating asphalt shingled roofing above a portion of the animal handling facility and replaced it, installing 4000 square feet of new steel sheet roofing panels. We upgraded the alternative power supply system by replacing failing batteries. In addition, we purchased a small (2000 watt) portable generator for remote work along the fence line and for projects where operation of the 10kw generator was unnecessary. We also fed and cared for an average of 20 moose and 22 caribou during this period.

JOB 2: Drug Testing - No drug testing was performed during current period

JOB 3: Reproductive Indices - No work performed during current period

JOB 4: Nutritional Condition Indices -

4a. Leptin: We compiled approximately 400 moose serum samples for leptin assay from statewide populations in which blood and ultrasonic rump fat measurement were collected. Statewide moose populations (and corresponding collaborators) included Denali Park (Layne Adams), Copper River Delta (Dan Logan), McGrath Area (Rod Boertje and Mark Keech), Togiak National Wildlife Refuge (Andy Aderman), Tanana River (Rod Boertje and Mark Keech), Noatak National Park and Preserve (Brad Schulz), Nelchina Basin (Ward

Testa), Yakutat Foreland (Matt Moran), and the MRC. Dr. Duane Keisler (University of Missouri) completed the leptin assays in April and we have begun analysis of the data to assess the relationship between serum leptin concentration and percent body fat.

4b: Purine derivatives: No work was performed on this objective during the current reporting period.

JOB 5: Miscellaneous Projects

In order to facilitate ultrasound training and instruction, we upgraded our portable ultrasound with an external LCD screen and image storing capability (Smart Card).

JOB 6: Moose Digestion, Reproduction, and Physiology

6a. Determination of dry matter and protein digestibility of forage plants

We ruminally fistulated a yearling cow moose for future *in situ*, nylon bag digestion trials of common moose forages of varying protein and plant secondary compound content (e.g. tannins). We also collected sample moose forages from the north Kenai Peninsula, Nelchina Basin, and Denali Park for nutritional analyses (including digestibility, total phenolics, crude protein, and tannin content).

6b. Use cell culture and toxicological methods to determine toxic effects

No work was performed on this objective during the period.

6c. Diet composition analysis was performed on feces collected during Yakutat moose captures in November 2002 (n=29) and March 2003 (n=24). While the March 2003 samples are currently being analyzed, the results from the March and November 2002 samples are included here.

Plants	Mar-02	Nov-02
Alnus sinuate stem	15.4	10.4
Myrica gale leaf	1.7	
Myrica gale stem		3.8
Oplopanax leaf		0.9
Oplopanax stem	1.1	1.3
Populus stem	10.7	10.6
Rhododendron?		0.4
Rubus leaf	0.6	1.1
Rubus stem	3.1	5.0
Salix leaf	1.7	
Salix stem	60.1	29.7
Sambucus stem		0.7
Vaccinium stem	2.2	7.3
Shrub leaf	1.4	
Shrub stem	1.7	0.7
Total Shrubs:	99.7	71.9
Equisetum:	0.0%	25.6%

Fern capsule:	0.3%	0.0%
Grass:	0.0%	0.7%
Carex:	0.0%	1.4%
Moss:	0.0%	0.4%
TOTAL	<u>100.0%</u>	<u>100.0%</u>

JOB 7: Caribou Digestion, Reproduction, and Physiology -

No work on this objective was performed during the current period

JOB 8: Development of research proposals, reports, and publications

We jointly developed a research proposal with Bill Collins (ADF&G) and Don Spalinger (UAA) to investigate the potentially limiting nature of nitrogen in the diet of moose. Specifically, we proposed to 1) monitor the nutrient concentrations of the principal foods of moose in the Nelchina Basin and 2 other moose ranges in southcentral Alaska (Kenai Peninsula and Denali National Park), 2) study the diet composition of moose in the Nelchina Basin, and 3) determine the nitrogen digestibility of common moose foods relative to their tannin compositions and the efficiency of nitrogen utilization in moose on varying dietary nitrogen levels. Tractable moose, hand-reared at the MRC, and MRC facilities are essential to successful completion of these studies. Tame MRC moose will be transported to representative ranges during the summer season and used to determine diet composition and intake rates. Nitrogen digestibility will be determined using nylon bag digestion techniques with a fistulated moose kept at the MRC. Finally, nitrogen balance trials, to verify the findings of Robbins et al. 1987 and Hanley et al. 1992 regarding the digestibility of protein and the binding of proteins by tannins in mule deer and extend the application of the BSA assay to determine digestibility of proteins in moose forages, will be conducted at the MRC.

III. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

None

IV. PUBLICATIONS

HUNDERTMARK, K. J., AND C. C. SCHWARTZ. 2002. Evaluation of bioelectrical impedance analysis as an estimator of moose body composition. Wildlife Society Bulletin 30:915-921.

V. RECOMMENDATIONS FOR THIS PROJECT

None.

VI. APPENDICES

None

VII. PROJECT COSTS FOR THIS SEGMENT PERIOD

FEDERAL AID SHARE \$ 54,910 STATE SHARE \$ 18,304 = TOTAL \$73,214

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APPROVAL DATE: _____